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"I have made a sketch, which I enclose, of the region where they were; and again when she was two days older, and when the ridge was full in the light I made the enlarged sketch.

"I have no doubt the light was from the two small mouths shown in the angles of the cruciform ridge.* . . . In looking at the ridge, as drawn, the form of the lights is just what we should expect anything flowing from these mouths would take. If they are mouths, which I am assuming them to be, they are very small.

"My telescope is a reflector of 12 feet focal length and 10 inches in diameter, of our own making. The speculum has not been polished these twelve years, and may not show so sharp as it did at first."

Description of an Apparatus for the Mechanical Imitation of Precession. By T. W. Burr, Esq.

"Being desirous, for educational purposes, of obtaining some piece of mechanism which should represent the motion of precession in a more tangible form than can be done by diagrams on a plane surface, my attention, while considering the subject, was arrested by a description in vol. i. page 43, of the *Monthly Notices*, of an instrument invented by Mr. Atkinson, to illustrate certain phenomena of rotation. The account is very short and not very lucid, stating that 'it consists of a flat circular disk, through the centre of which passes a small endless screw, having a cup in one of its extremities.' When this cup is set on a point, and the disk made to rotate in its own plane, the whole rotating plane performs at the same time a slow revolution round the perpendicular to the horizon which passes through the point of suspension, and the direction of this revolution will either coincide with, or be the reverse of, the rotation, accordingly, as the centre of gravity is above or below the point of suspension; affording in the latter case, says Mr. Atkinson, 'an apt illustration of precession.'

"Acting upon this suggestion, and adding such improvements as enable the instrument more effectually to represent the real state of the case, I have had the apparatus submitted to the meeting constructed.† It consists of a small terrestrial globe, having a steel axis projecting from the north pole, and the equator extended into a broad brass disk. The globe is suspended on a point, rising into its interior from a base which supports a horizontal graduated circle representing the ecliptic; and the whole

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* The writer here makes a remark which is not very clear respecting the form of the luminous spots. The light on the right side would appear to have consisted of two streaks of unequal length disposed in opposite directions.—EDITOR.

† It was beautifully made by Mr. Hislop, chronometer-maker, 108 St. John Street Road.

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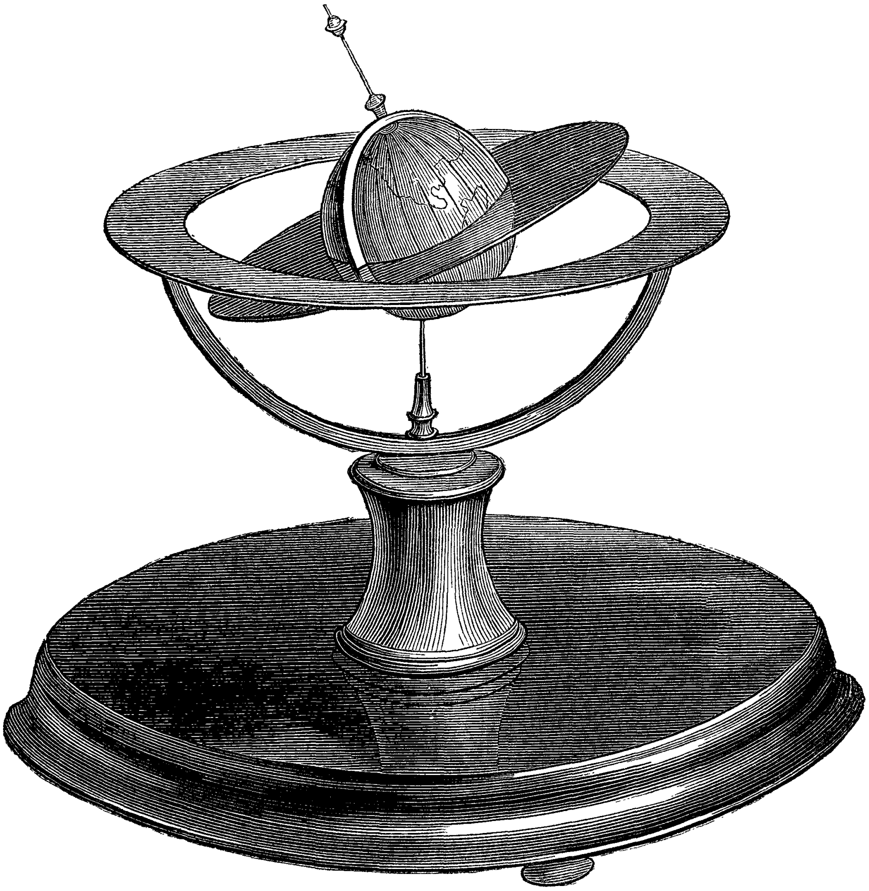

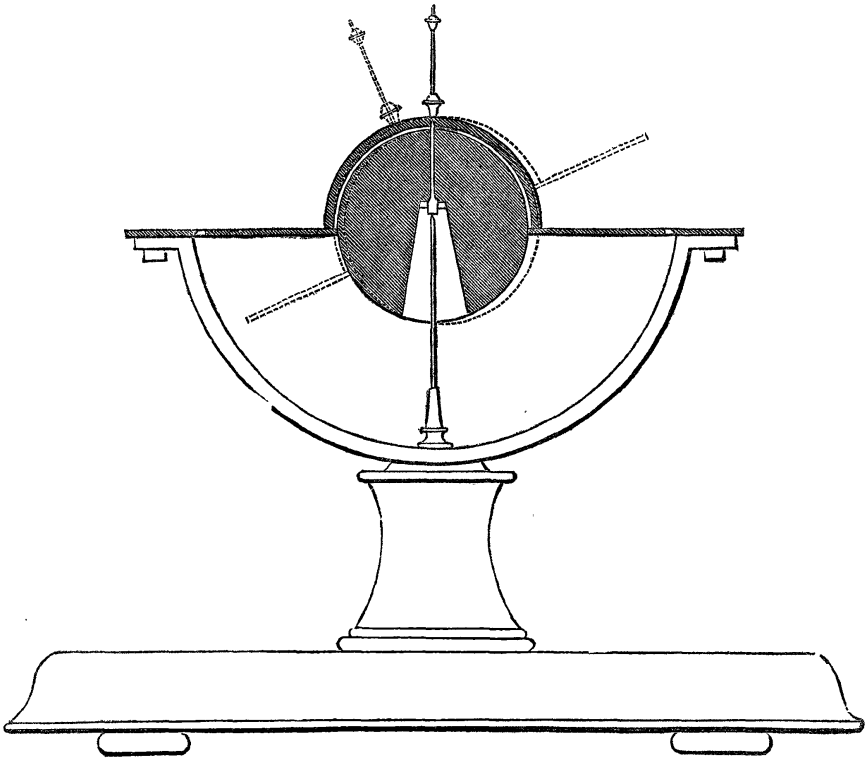

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being nicely balanced, the ecliptic and equator coincide. If now a small weight be fixed to the equatoreal disk, to represent the attraction of the sun and moon, or the axis be considerably inclined, which answers the same purpose, and the globe be rapidly rotated, representing the diurnal motion, it will be seen that at the same time there is generated a slow conical movement of the projecting axis round the imaginary pole of the ecliptic, in a direction opposite to that of the diurnal rotation; and that the equinoctial points, or intersections of the ecliptic and equator, move round in the same way."

The author remarks that, upon attentive observation, it will be found that the axis does not describe a perfect circle round the perpendicular to the ecliptic, but that there is a minute undulation resembling the nutation of the earth's axis.

"I am aware that the mechanical causes of the motions set up are not the same with the physical causes of the real motions of the earth, but the object was to obtain an imitation of the effect, regardless of the exact identity of mechanical causes. So far as I understand the description of Mr. Atkinson's instrument, there is, of course, an identity of principle and effect, but he seems to have had other points to illustrate, and only mentions precession as an incidental one; whereas, in my construction of the apparatus, those additions are made which enable it to carry out the imitation to the fullest extent; and having myself found it useful in explaining the motions referred to, I have thought a knowledge of it might be acceptable for a like purpose to other members of the Society. The drawings show the apparatus in perspective and section, and are sufficient, with the preceding description, to explain it without references."*

Note by the Editor.

In the *Edinburgh New Philosophical Journal* for April 1855 there is a paper by Mr. James Elliot, Teacher of Mathematics, Edinburgh, which also contains a description of an apparatus

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* Apparatuses for exhibiting the conical movement of the earth's axis, which occasions the precession of the equinoxes, have also been contrived by Bohnenberger, Fessel, and Professor Powell. They are all unexceptionable, both in principle and practice, and serve to represent the phenomenon with the most complete fidelity. This remark will appear superfluous to many persons, but it has been deemed necessary to advert to the circumstance in consequence of objections having been urged against those apparatuses, which could only arise from an imperfect knowledge of the mechanical principles of their construction. Nor can such objections be justified by referring them to an imperfect working of the apparatus in any case, since from the nature of the mechanism it is impossible that the axis of rotation, if it have a movement at all, should have any other than a conical movement. In all these contrivances (as in Atkinson's original apparatus, now in the possession of Mr. Riddle at Greenwich) there is an arrangement of great simplicity, by which the conical motion of the axis of rotation may be rendered *direct*, as exemplified by the spinning-top or *retrograde*, as in the case of the earth's motion, thus affording a most instructive view of the mechanical principles which determine the grand phenomenon of the precession of the equinoxes.—EDITOR.